DOCUMENT RESUME

ED 419 541 IR 057 043

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TITLE Comparison of 1995-1996 High School Students Attitude Survey Results.
PUB DATE 1997-00-00
NOTE 47p.; Paper presented at the Annual Conference of the American Evaluation Association (San Diego, CA, November 4-8, 1997).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Change; *Computer Assisted Instruction; *High School Students; High Schools; Instructional Effectiveness; Instructional Improvement; Instructional Material Evaluation; *Interactive Video; *Student Attitudes; Student Reaction; Surveys

ABSTRACT

Prior evaluation has been concerned with the attitude of high school students toward the educational interactive video program for the year in which they were participants. This analysis assessed whether there had been changes in attitude toward the program from one year (1995) to the next (1996) and if improvements made based on the 1995 evaluation had been effective. Three hundred forty-four (106 from 1995) high school students enrolled in an interactive video class participated in this evaluation. Change was assessed on seven constructs and by open-ended questions concerning strengths, weaknesses, and suggested improvements. This analysis revealed that there has been a significant improvement in equipment and its maintenance. Strengths of the interactive video program have remained relatively constant over this two-year period. There were no significant differences in students' evaluation of the interactive video program over the two years, but there was concern over scheduling and behavior weaknesses. Several charts illustrate results. (AEF)

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ED 419 541

Comparison of 1995 - 1996 High School Students Attitude Survey Results

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Paper presented at the annual conference of the American Evaluation Association. San Diego, November 1997.

IR057046

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Abstract

Prior evaluation has been concerned with the attitude of high school students toward the educational interactive video program for the year in which they were participants. This analysis assessed whether there had been changes in attitude toward the program from one year (1995) to the next (1996) and if improvements made based on the 1995 evaluation had been effective. Three hundred forty four (106 from 1995) high school students participated in this evaluation. Change was assessed on seven constructs and by open-ended questions concerning strengths, weaknesses, and suggested improvements. This initiates a trend analysis to be continued yearly.

Prior evaluation with the data used in this study has been concerned with the attitude of high school students toward the interactive video program (ITV) for the year in which they were participants. The purpose of this analysis is to determine if there have been changes in attitude toward the program from one year (1995) to the next (1996). This is the beginning of a trend analysis to be continued each year. By comparing attitude changes from year to year, the impact of improvements and changes to the program/facilities can be detected. If a supposed improvement has had a substantial effect, it is hoped that effect will be detected. If the effect reflects improvement in attitude, then it will be assumed the improvement caused this change. This would suggest continuation of the improvement. If the effect seems to be detrimental, this would suggest the problem should be approached by another method. In addition, this approach permits facility administrators to anticipate or detect problem areas while they are still in a manageable condition.

Subjects

All students enrolled in an interactive video class at this facility during the Spring semester, 1995 and Spring semester, 1996 were surveyed. Surveys were administered during the regularly scheduled class time by the class instructor or remote facilitator. For analysis, respondents were categorized by site (home or remote), by year of program existence (year 1 or year 2), and by survey year (1995 or 1996). Of the 184 returned student surveys during Spring 1995, 106 were completed by high school students. Twenty-one of the 66 home site respondents were participating in a first year program. Fifteen of the 40 remote site respondents were participating in a first year program (see Figure 1). Surveys were returned from respondents at nine different schools in nine subject areas (see Figure 2).

Figure 1

Respondents

By Site and Year

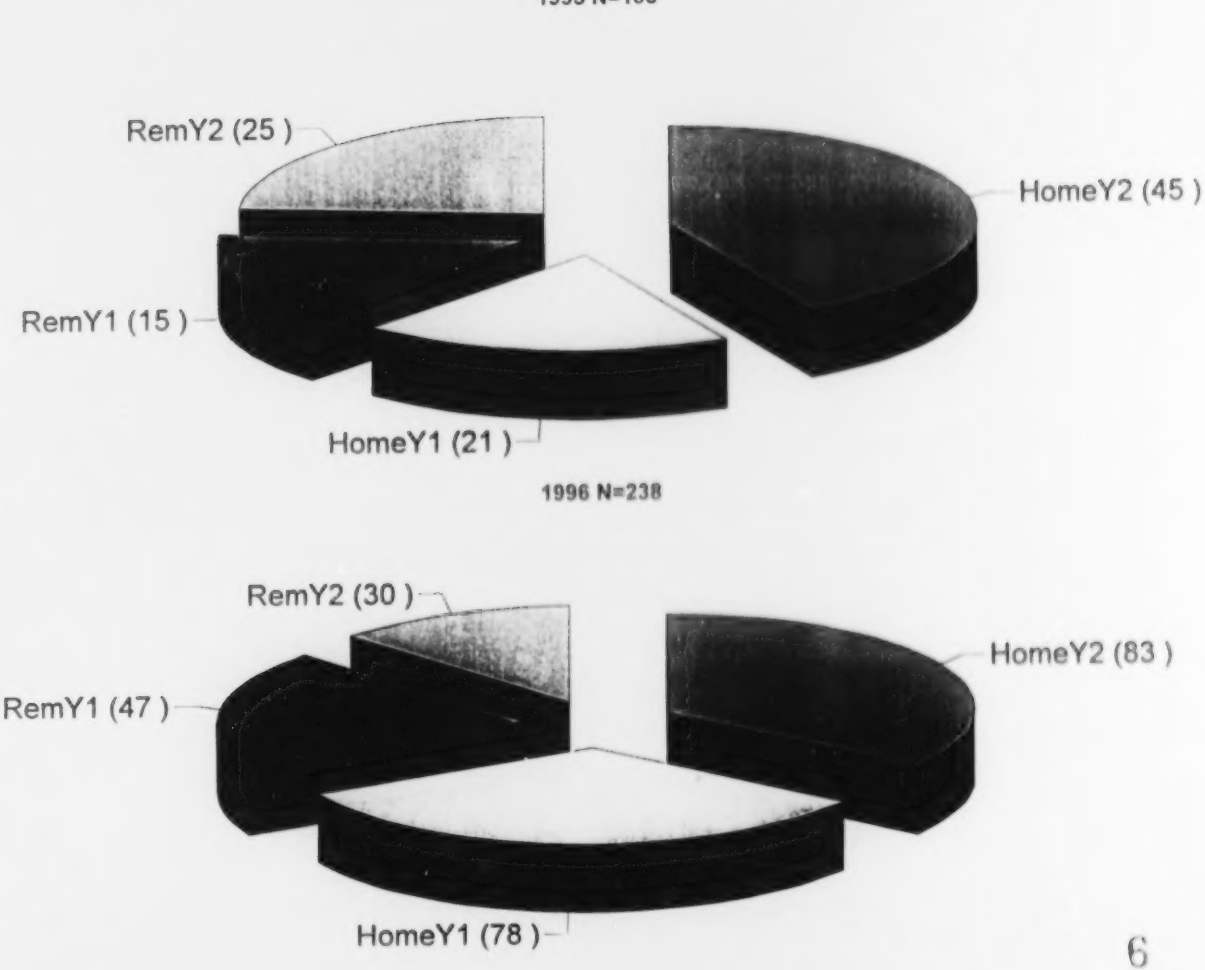
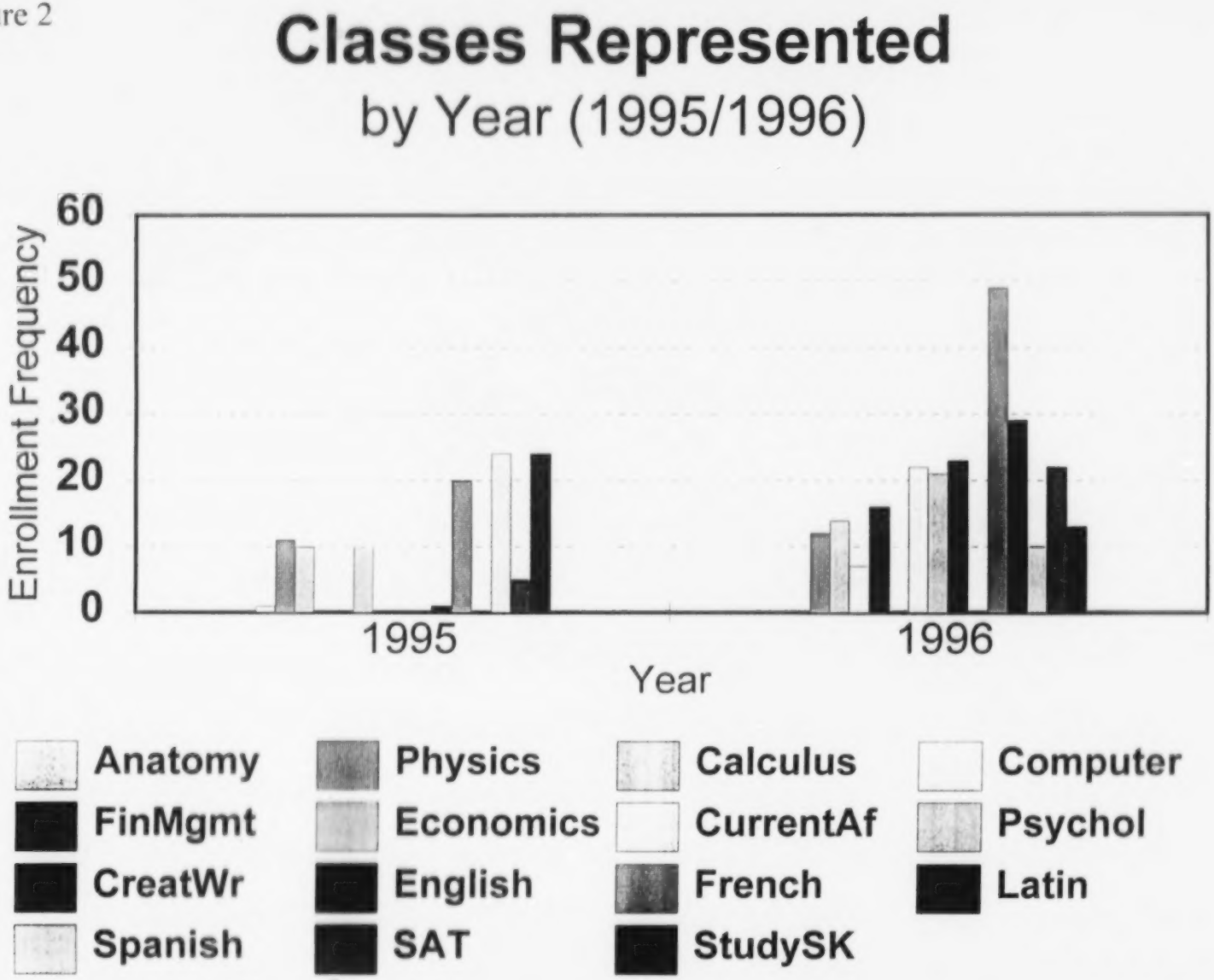


Figure 2


Classes Represented
by Year (1995/1996)
Enrollment Frequency
60
50
40
30
20
10
0
1995
1996
Year
Anatomy
Physics
Calculus
Computer
FinMgmt
Economics
CurrentAf
Psychol
CreatWr
English
French
Latin
Spanish
SAT
StudySK

There were 238 returned surveys by high school students during Spring 1996. Seventy-eight of the 161 home site respondents were in a first year program. Forty-seven of the 77 remote site respondents were in a first year program. Surveys were returned for 12 subject areas (all levels of Spanish were coded Spanish) from 14 high schools.

All student surveys (344) were entered for analysis. Three hundred nine responses were coded as non-applicable. This was less than 5% (7392 responses). It was assumed that those who marked non-applicable could not be ranked as undecided since that option was offered and was not chosen. Since any numeric value assigned would bias the results (1=strongly agree, ergo 0 would be very strongly agree) and the proportion was relatively small, these were used as missing values. In addition, 91 responses were not marked. These were also used as missing values yielding a grand total of 400 missing values (<6%). Although the proportion of missing values is relatively small, if listwise deletion were used many cases would be excluded from analysis. To prevent this, mean substitution was used for factor analysis.

Measurement and Analysis

The survey instrument consisted of demographic information (school, gender, grade, etc.) and 34 questions. Question 1 requested reason for taking the ITV class. Questions 2-31 were 5-point Likert style questions. Questions 32-34 were open-ended requesting strengths, weaknesses, and suggestions for improvement for the ITV program. Questions 21-26 were to be answered by remote site participants only. Six questions were negatively stated in the questionnaire. These were reverse coded for this analysis. Previous exploratory analysis has provided a seven-factor model for the questionnaire as well as reliabilities of the factors for the Likert type questions in common for both remote and home site students. While these models (1995, 1996) were

similar, there were some discrepancies between them This analysis uses one model to conduct multivariate analyses.

Responses to open-ended questions (Q32-34) were initially coded based on the response. After determining similarities of the responses, these were placed in categories. For example, the suggested improvements response "have schools on the same schedule" was coded as '38'. It and the responses "synchronize time schedule" and "establish snow schedule" were then summed to a major category "scheduling'. If a specific response was infrequent (<10) and could not reasonably be included within a category, it was included in other. For this analysis, if either survey year (1995, 1996) had sufficient responses to create a category, that category was included for contrast even though one year may have zero responses. (Raw responses and their codes are listed in Appendix A, Tables 1-3). Categories were then summed to major categories and the proportion of categorical responses was contrasted by survey year (1995-1996) for all categories. The assumption was made that there would be similar proportions of responses for each category for each year. It must be remembered that these are not independent responses. A respondent could submit three responses for strengths. All three responses may be variations of items coded as Availability.

Results

Strengths

There were 142 responses concerning strengths (106 respondents) in 1995 and 352 (238 respondents) in 1996. The proportion of responses citing classes offered at remote sites as a strength had decreased (8% vs 1%) from 1995 to 1996. When, however, categories were summed (ie, remote and availability became access - meeting people and open-minded became interaction - technology and instruction became learning), no practical differences were detected (see Figure 3). For example, in 1995, 39% of the respondents cited interaction as a strength. In 1996, 38% of the respondents cited interaction as a strength. This finding indicates that those areas perceived as strengths in 1995 are still perceived as strengths in 1996.

These categories are further depicted by site (Figure 4) and by existence year (Figure 5). Typically remote site students perceive availability or remote as more important (assuming number of responses reflects importance) than home site students, while home site students perceive meeting people or interaction aspects as more important than remote site respondents (see Figure 4). When contrasted by year of program existence, students in the first year of the program in 1995 did not differ from their counterparts in 1996 nor did those in the second year (see Figure 5).

Figure 3

Strengths: 1995/1996

High School Students

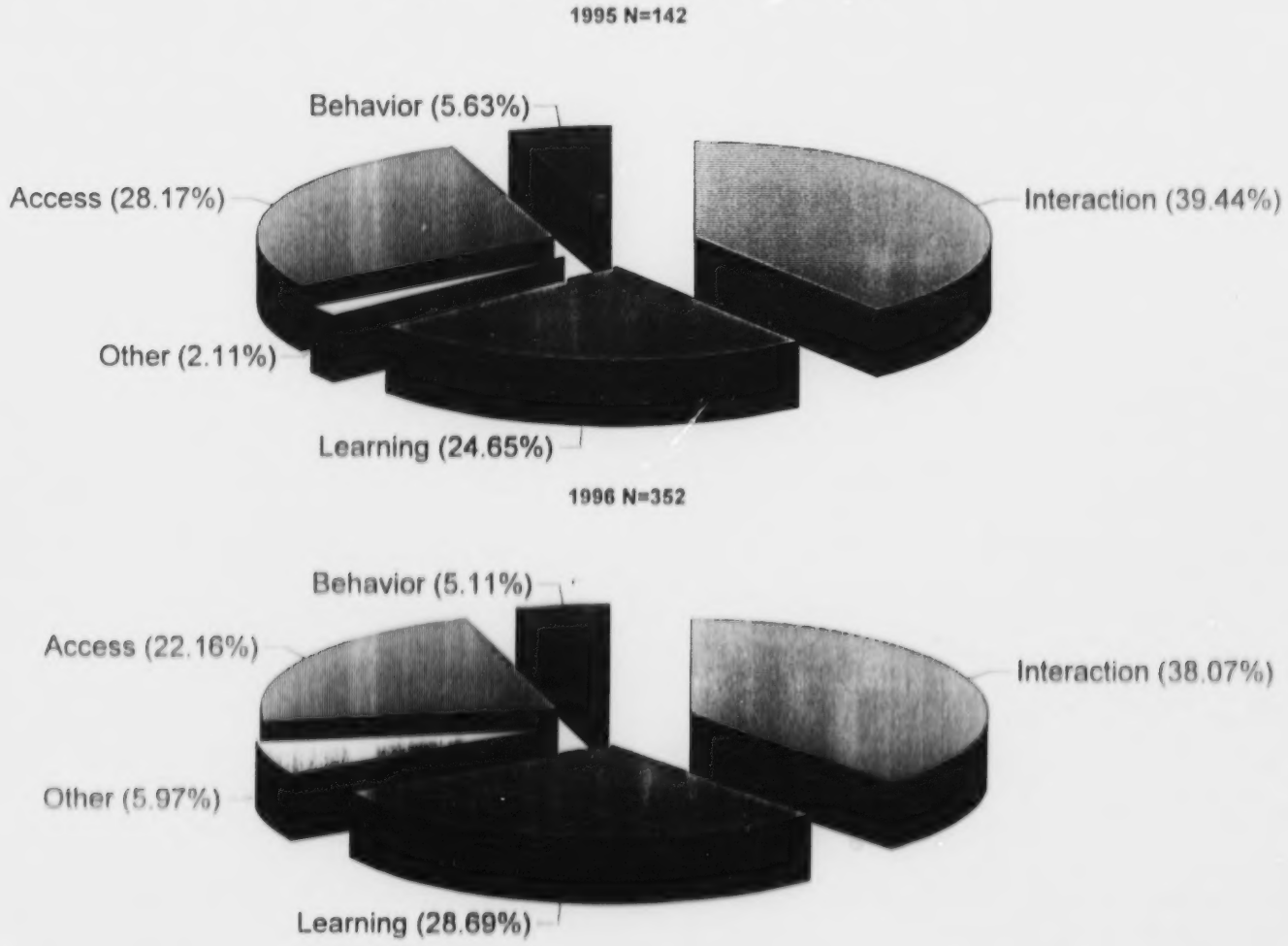


Figure 4

Strengths: 1995/1996

Site by Survey Year

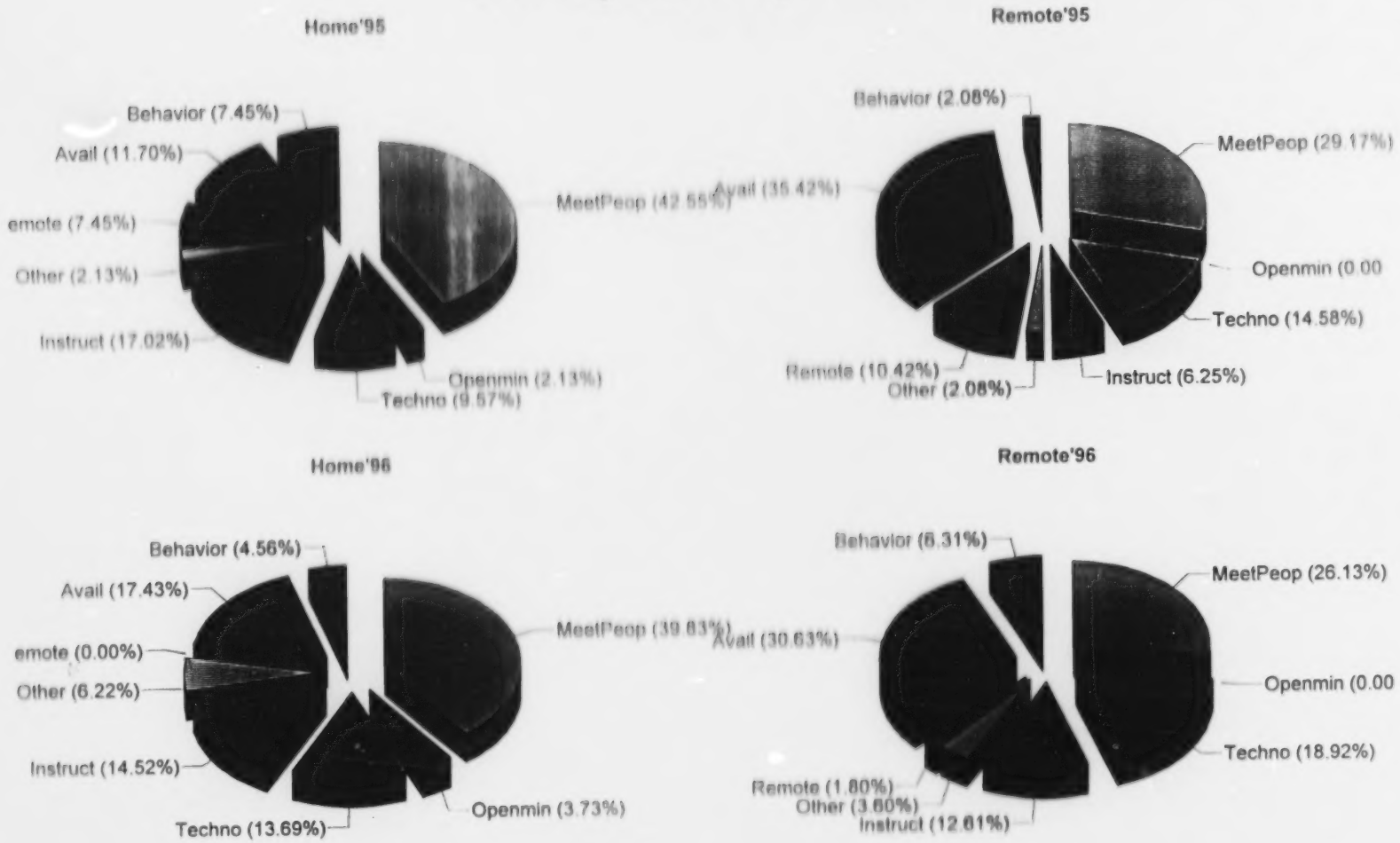
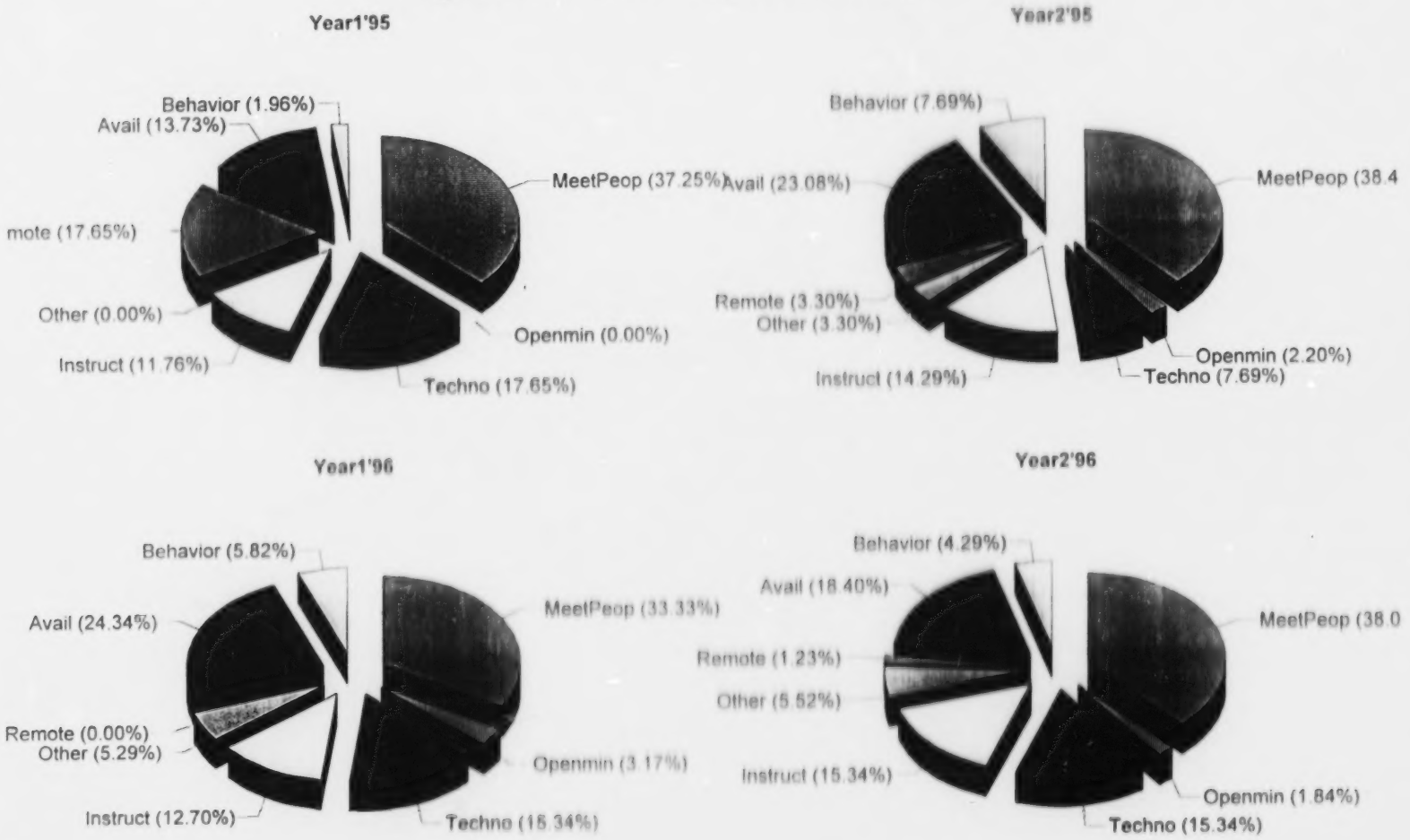


Figure 5

Strengths: 1995/1996

Program Year by Survey Year



Weaknesses

There were 128 responses to the weakness question in 1995 and 323 in 1996. The proportion of responses citing audio problems had decreased from 35% in 1995 to 16% in 1996. The proportion citing video problems had also been reduced from 19% to 2%. Minor equipment problems, on the other hand, were not a category in 1995, but were 16% of the responses in 1996. The scheduling category had also increased from 2% in 1995 to 12% in 1996.

When categories were summed (camera, sound, severe equipment problems, and minor equipment problems formed equipment - remote and instruction formed instruction) differences between 1995 and 1996 were still detected. In 1995, 61% of the weakness responses concerned equipment failure or problems. This was reduced to 43% in 1996. The scheduling response remained an increase in proportion from 1995 to 1996 (see Figure 6). These responses are further depicted by site (see Figure 7) and by year of program existence (see Figure 8). Home site responses (Figure 7) and responses by students in an established program (Figure 8) cite behavior (cheating, lack of discipline) as weaknesses of the program more frequently than remote site or those participating in a new program.

These results indicate that although there may still be equipment problems that need to be resolved, there has been a significant improvement. More troubling is the increased incidence of scheduling problems and the non-significant increase in behavior cited as a weakness. While a proportional decrease in responses related to equipment requires an increase in another category (proportions must sum to 1), 62 weakness responses were related to behavior (cheating, lack of discipline, see Table A-2) in 1996 compared to 15 in 1995. In addition, 39 weakness responses referred to scheduling problems in 1996 but only 2 in 1995.

Figure 6

Weaknesses: 1995/1996

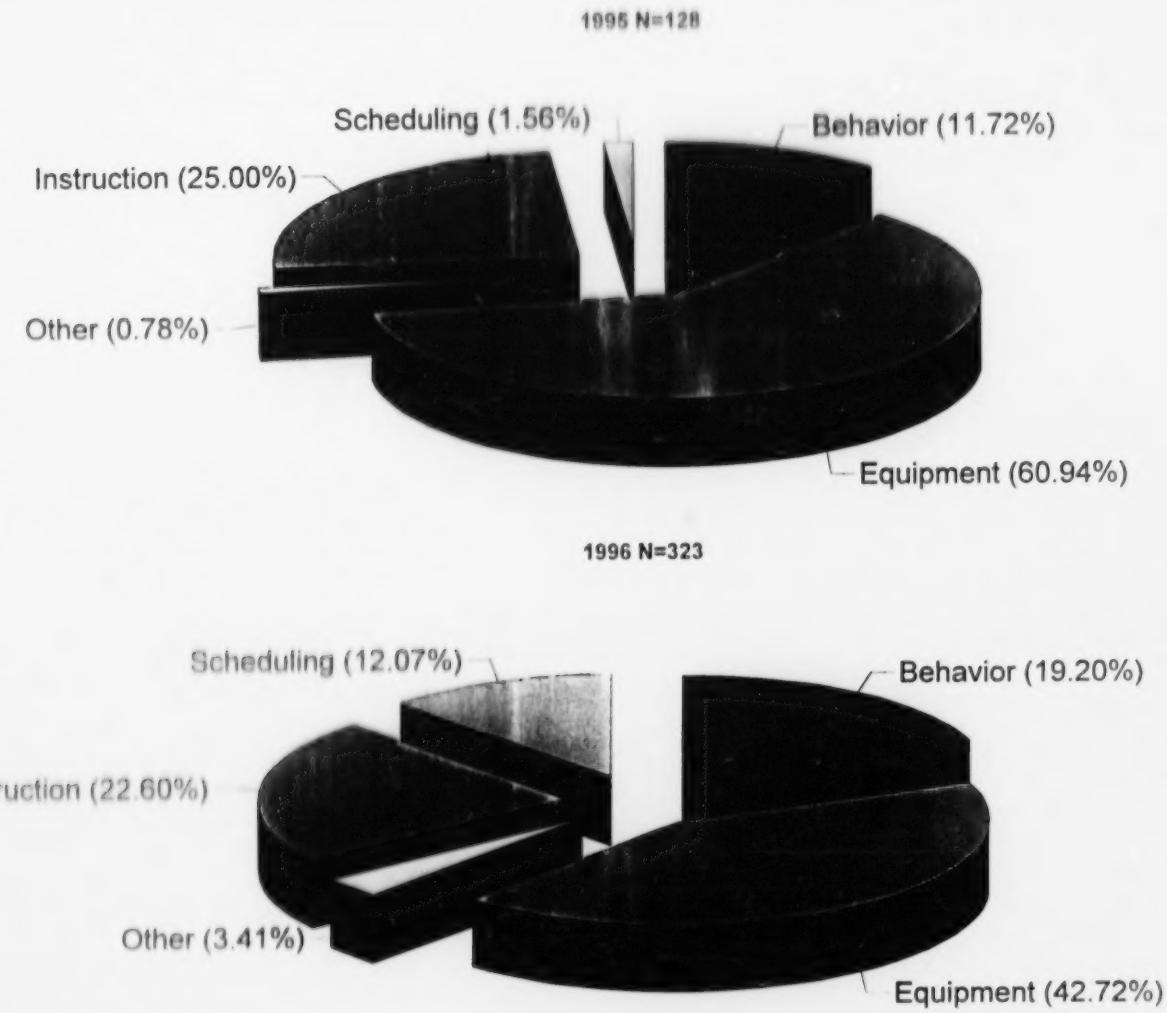


Figure 7

Weakness: 1995/1996

Site by Survey Year

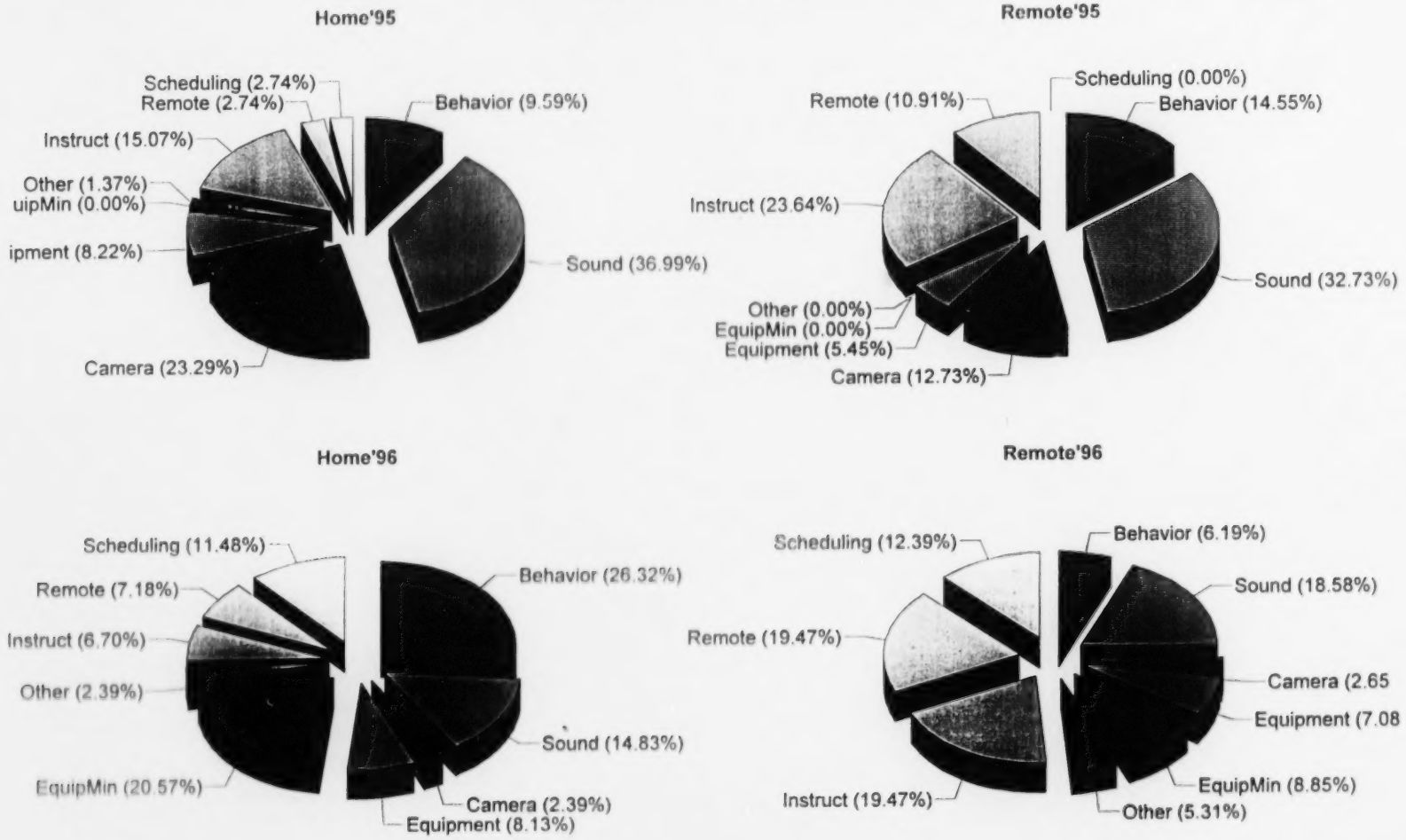
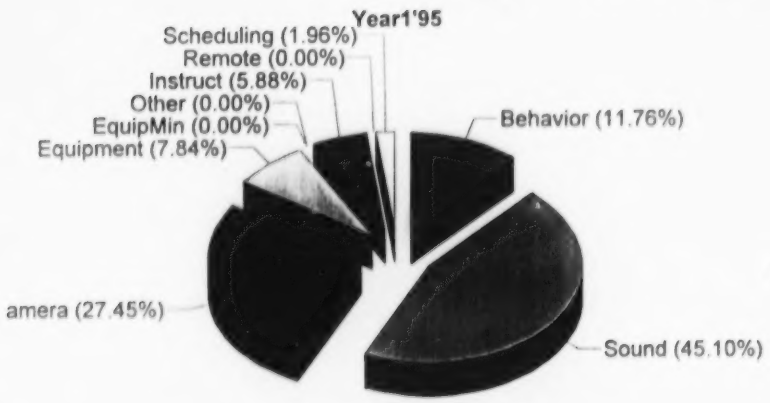
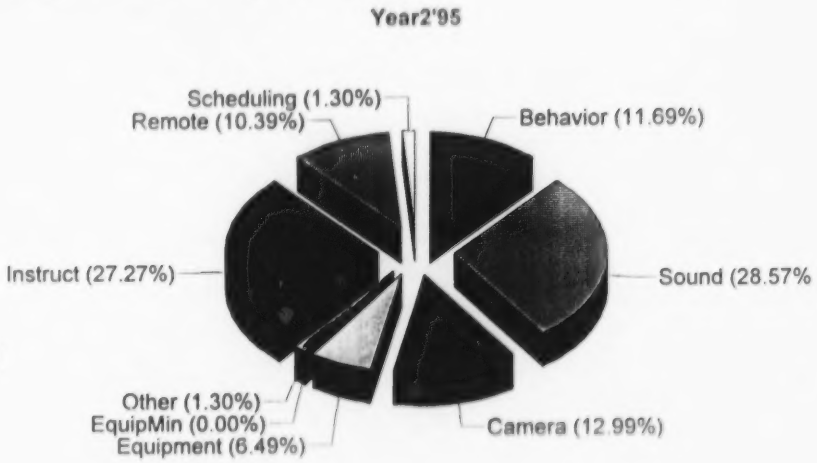


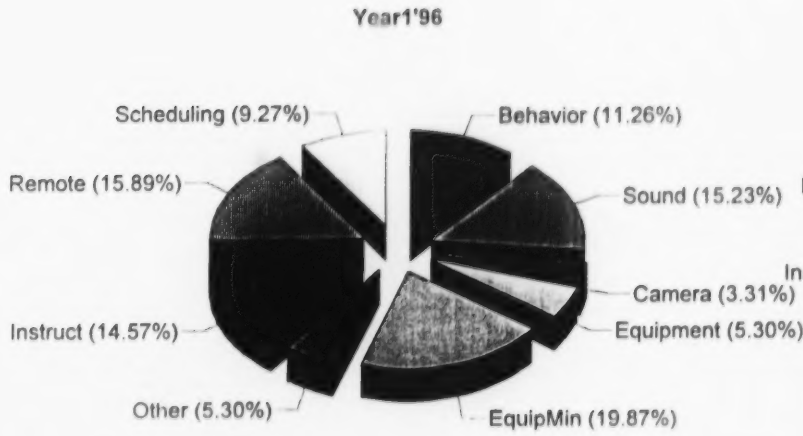
Figure 8

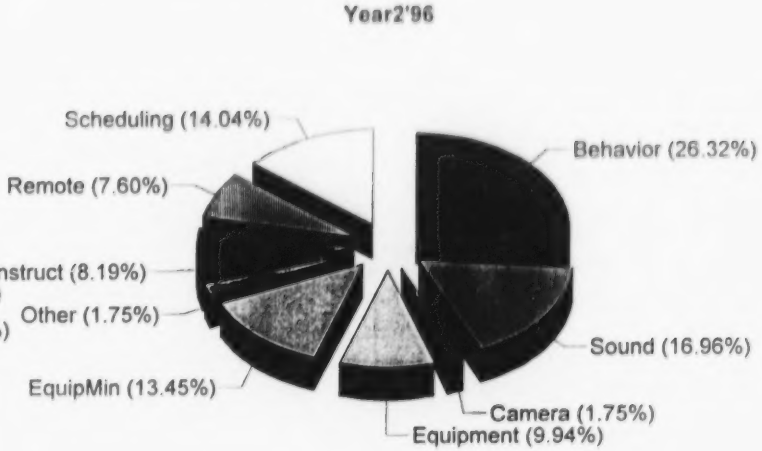
Weakness: 1995/1996

Program Year by Survey Year









Suggested Improvements

There were 93 suggested improvements made by high school students in 1995 and 230 made in 1996. The larger proportion of suggested improvements in 1995 were concerned with audio (20% vs 11%), camera (9% vs 1%), and remote (21% vs 12%) than in 1996. Suggested improvements in scheduling (1% vs 12%) and general equipment (2% vs 14%), on the other hand, had increased in 1996. When audio, camera, and equipment categories were summed to equipment (see Figure 9), although a larger percentage of the responses occurred in 1995 (31%), it was very similar to 1996 (26%). The nature of the suggested equipment responses, however, had changed. In 1995, the most frequent equipment suggested improvements were 'fix audio' and 'fix camera'. In 1996, suggested improvements centered around new equipment (ie, chalkboards, individual microphones).

When summed, suggested improvements in remote and scheduling remained the same. No other categories had changed significantly. The suggested improvements remote category included responses in 1995 indicating more remote classes should be offered. Obviously, more have been made available since that suggested improvement has decreased.

These responses are further depicted by site (Figure 10) and program existence year (Figure 11). These responses and the weakness responses suggest that while all equipment problems have not been resolved, there has significant improvement.

Figure 9

Suggested Improvements:

1995-1996

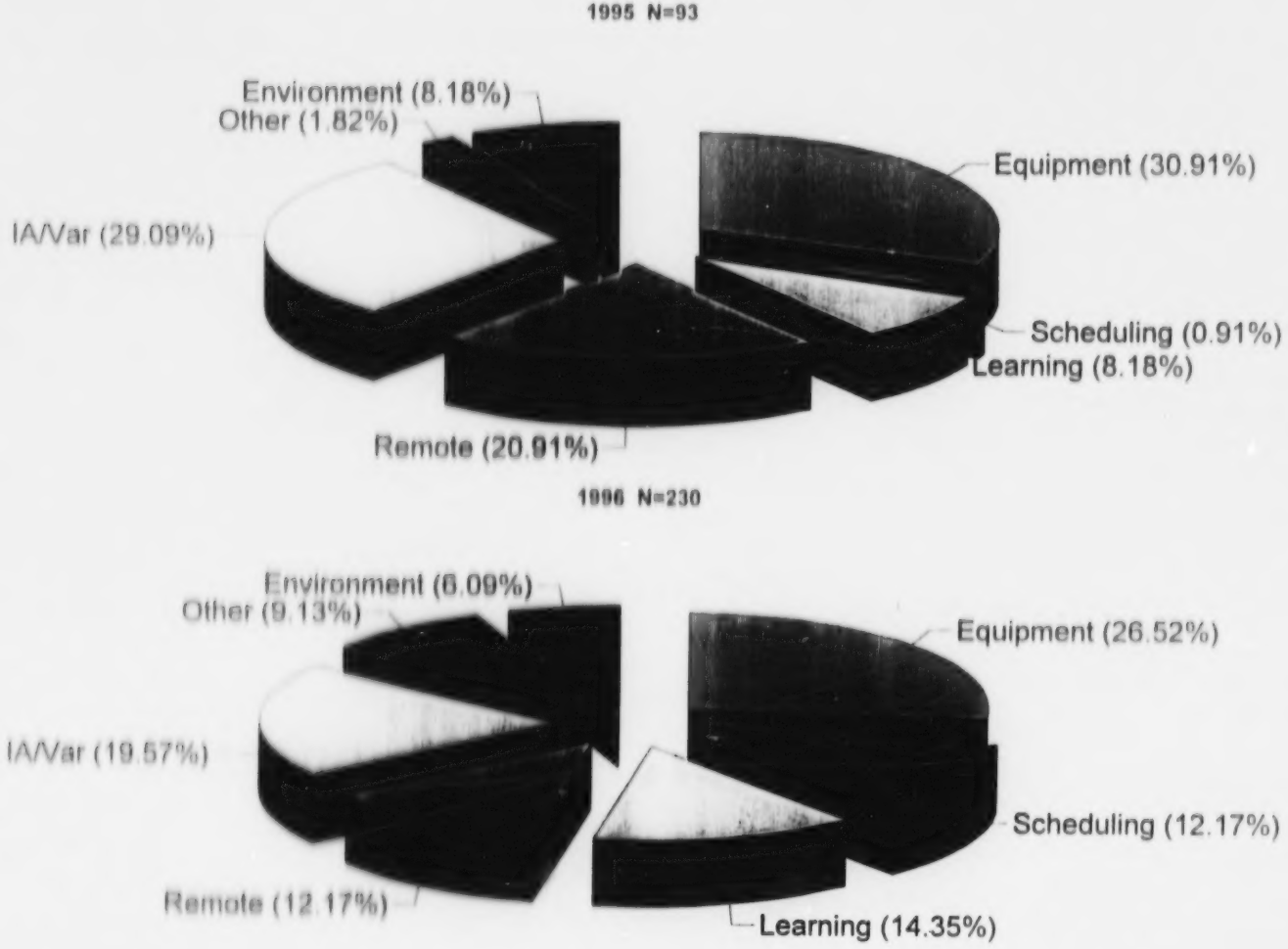


Figure 10

Suggested Improvements:

1995-1996: Site by Survey Year

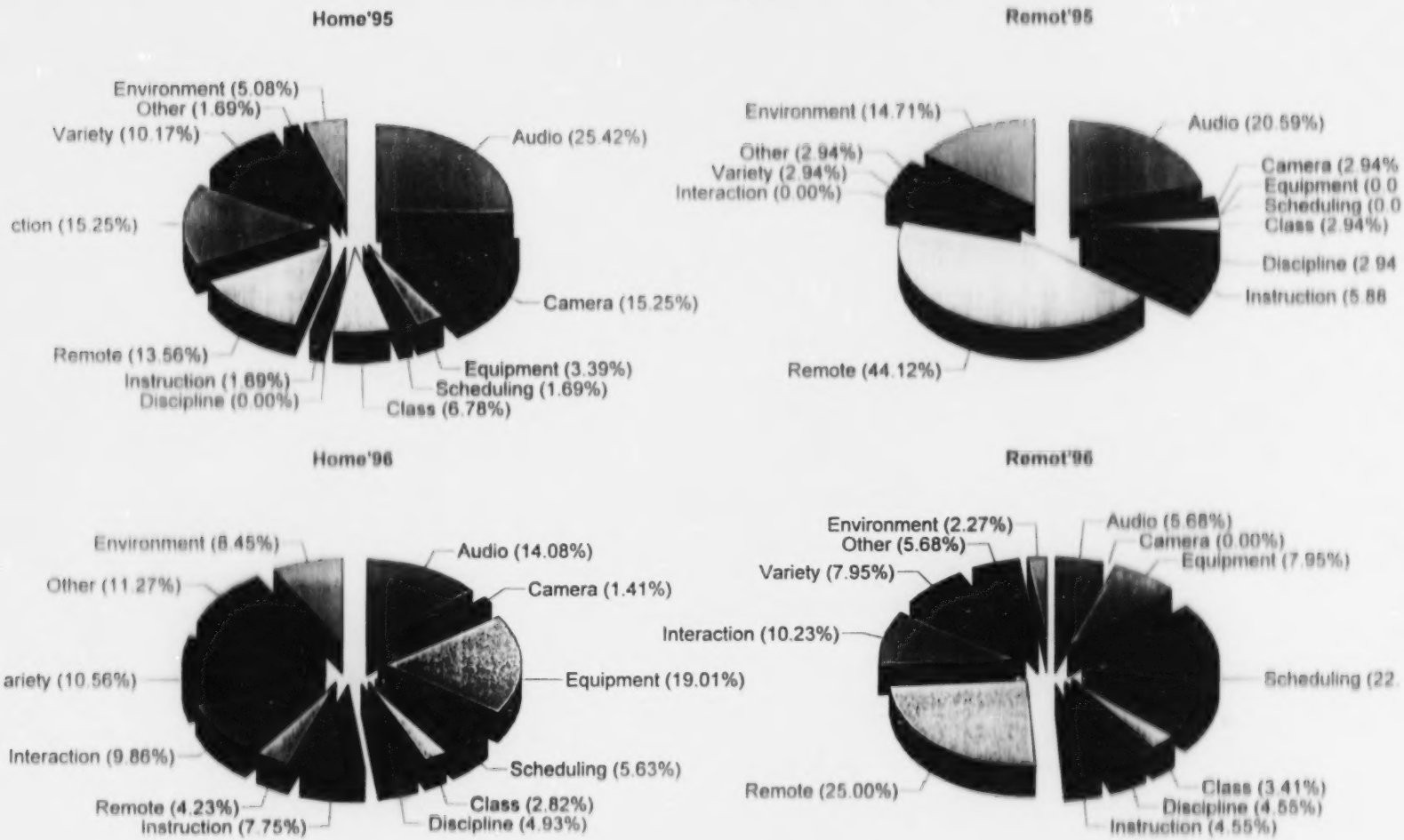
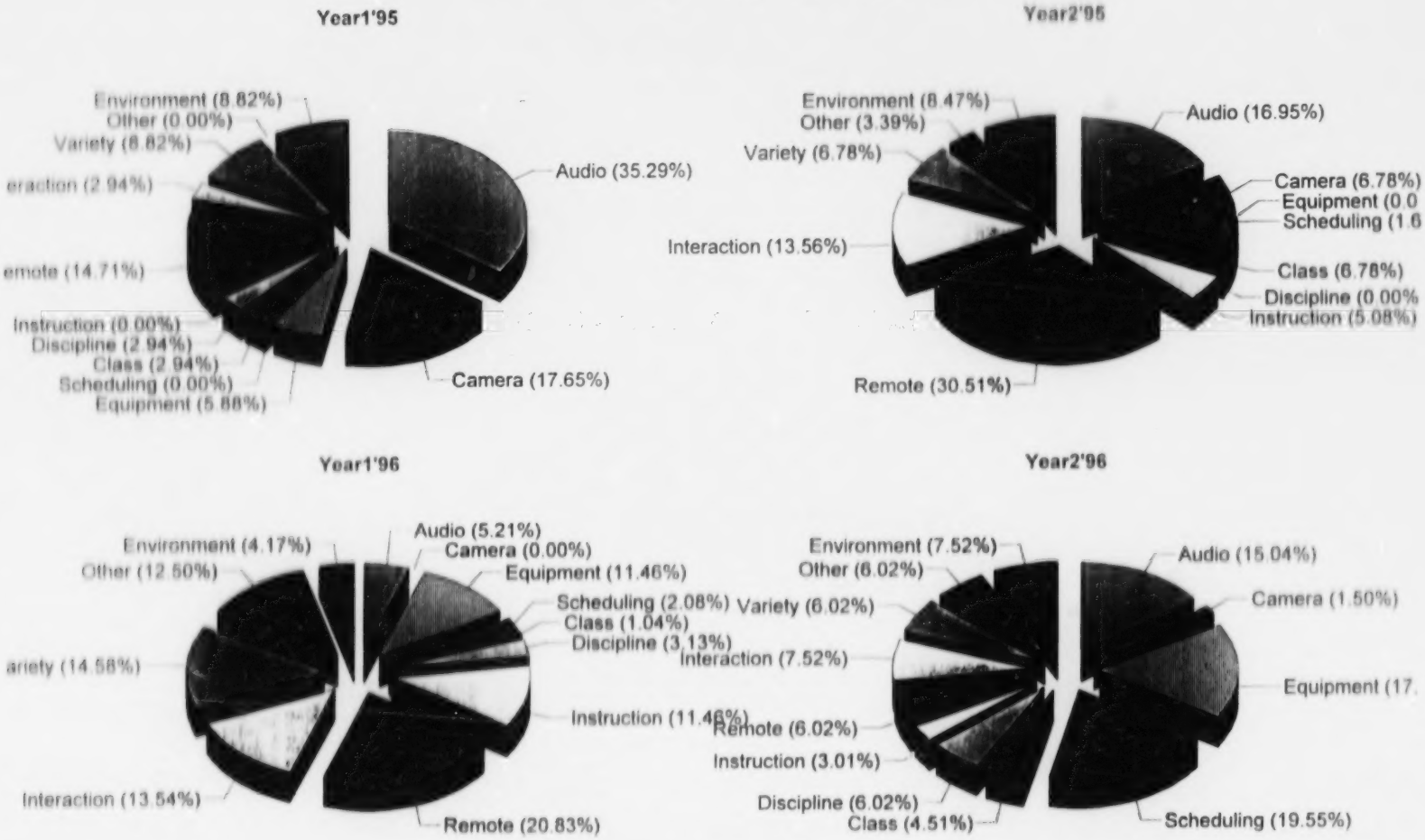


Figure 11

Suggested Improvements:

1995-1996: Year by Program Year



Factor Comparison

Factors did not load on the same questions consistently from 1995 to 1996. The Audio and Environment factors loaded on the same questions, and Materials Support and ITV evaluation factors loaded on similar questions (one question was added to each in 1996). There were several discrepancies, however, in the Student Behavior, Class Evaluation, and Interaction factors. When the 1996 data was forced to load by the 1995 model, reliabilities did not differ appreciably between survey years. When the 1995 data was forced to load by the 1996 model, reliabilities again did not differ appreciably between survey years. Some questions, however, did not fit either model substantively. For this contrast questions were placed on the factor which they appeared to fit logically. Reliability for both groups in this model was then determined (see Table 1). Although the reliability of the student behavior factor could have been increased to 0.62 by combining it with the interaction factor, this was not done. Exploratory analyses from both survey years have yielded a seven factor model. To combine two factors would alter that model significantly. The questions would also suggest that a separate factor could be established distinguishing teacher from class. This also was not done. The new model was an adaptation of the two previous models with as little change as possible while still providing a logical fit. Since this model fit reliability analyses almost as well as either of the models developed from the survey year data and it provided a logical explanation of the factors, it was used to contrast the survey years.

Initially the mean for each respondent on each factor was determined and imputed into the data. Multivariate analysis of these factors was then conducted using survey year (1995-1996),

site (remote, home), and year of program existence (year1, year2) as independent contrasts. Due to the relatively small sample size in 1995 (one group would only have 15 members if site and year were contrasted together), two analyses were run: one using site with survey year and one using year of program existence with survey year. The purpose of these analyses were primarily to determine if there had been changes in the interactive video program as students perceived it from 1995 to 1996. There were no significant main effects of survey year. Since this program had been rated so highly in 1995, any significant difference by survey year would most likely indicate a change for the worse (see Figure 12). There was, however, a statistically significant interaction effect of survey year with year of program existence ($F=3.79$[1], $df=6,276$, $p<.001$). The effect size was very small (0.08). Audio was the only significant contributor ($F=5.75$, df 1, 281, $p<.02$). This interaction is depicted in Figure 13 . The range of values for audio varied from a 2.11 (agree) to a 2.52 (agree). Although statistical significance was detected, there appears to be little practical importance.

In addition, there were main effects of both year of program existence and site. These are are not reported in this study.

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[1]All statistics are reported using the square root of the raw scores. Homogeneity of variance (BoxM) was not achieved using raw scores but was established with the square root function. Means are reported as raw scores.

Table 4

Factor Model for Contrasting Survey Years 1995, 1996

Factor	Loading	Question Number	Label
Materials Support	.73	Q4	Returned Work
		Q28	Talk to Teach as needed
		Q29	Class materials timely
		Q30	See Materials on System
ITV Evaluation.	.79	Q14	ITV Good Addition Curric
		Q15	R-Hestitate Take Anothr ITV
		Q16	Choice - ITV Class
		Q17	ITV Good Way Offer Class
		Q18	Take Another ITV
		Q19	R-ITV More Difficult
Audio	.78	Q27	Hear Students other sites
		Q31	Hear Quest other Sites
Environment	.55	Q2	Amt Desk Space
		Q3	Clear sight TV
Student Behavior	.53	Q8	Behav better ITV
		Q11	Better Listener
Class Evaluation	.67	Q5	R- Limit ITV Grade
		Q7	R Most Talk by Homesite
		Q10	R More Cheating ITV
		Q12	Study same ITV
		Q13	Tchr Attn Same Home/Remot
		Q20	R-More Study/Prep ITV
Interaction	.47	Q6	Know Stud Other Schl
		Q9	Meet Other Schl Stu mre ofte

Figure 12

Factor Means

1995/1996

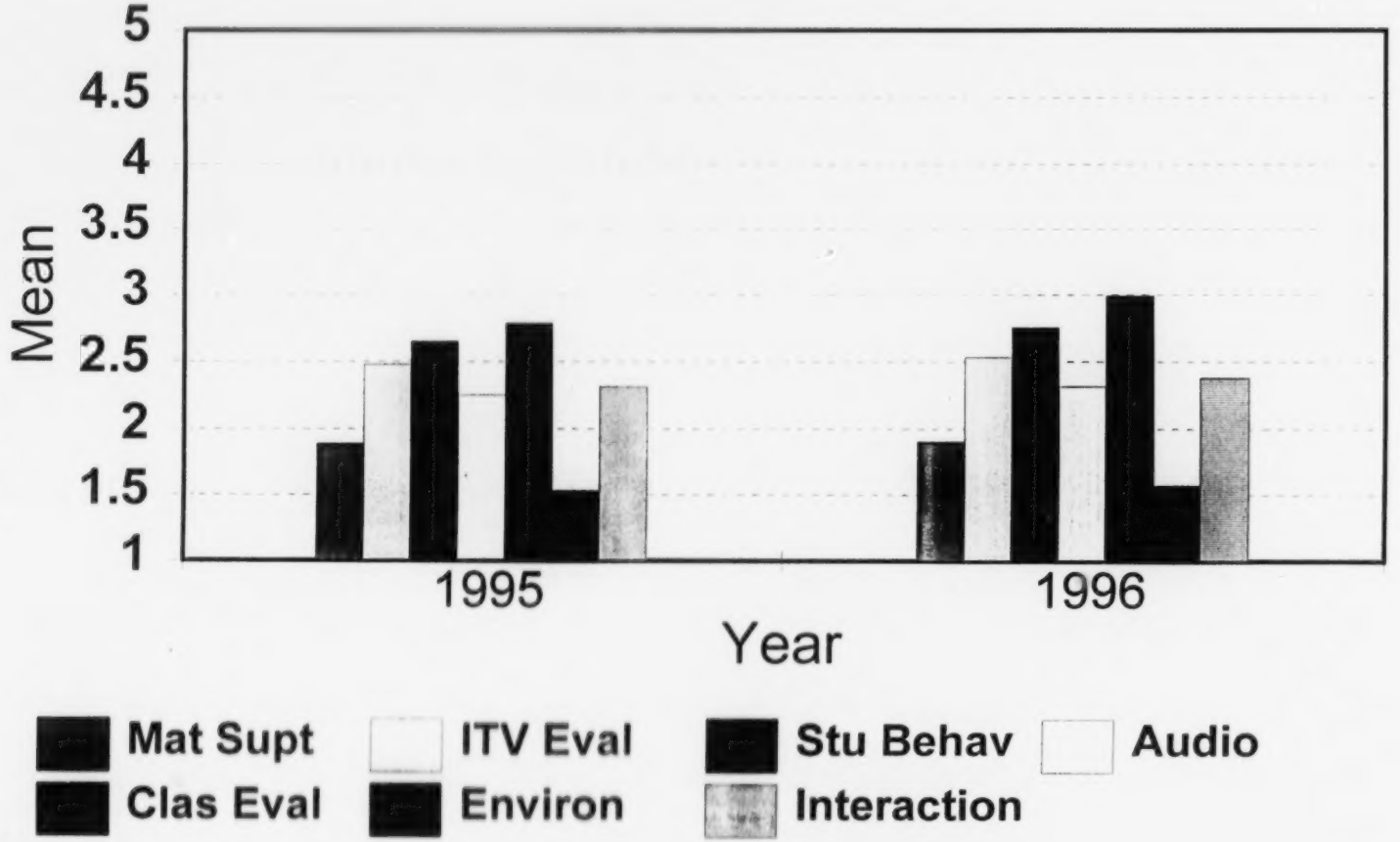
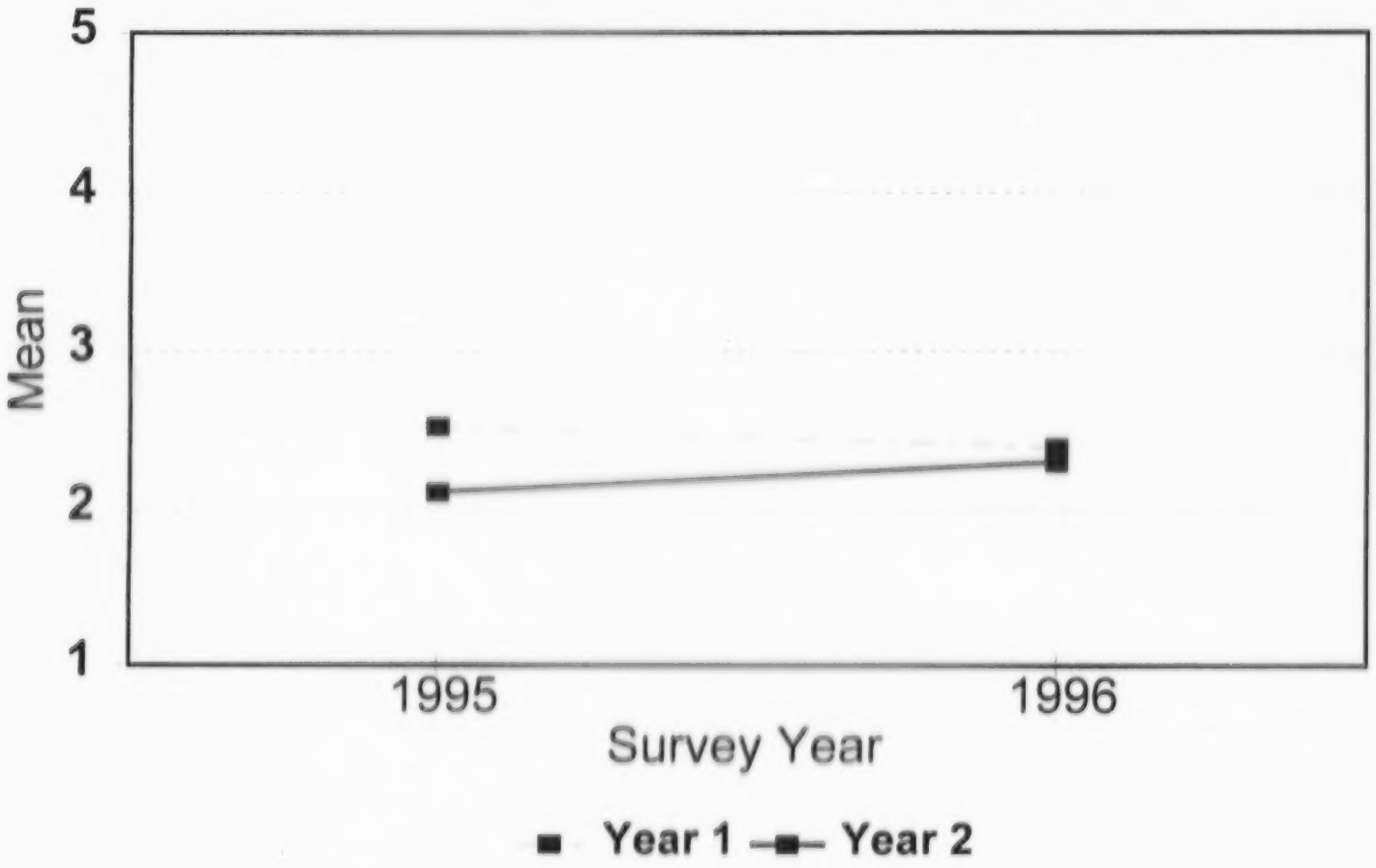


Figure 13

Interaction Effect: Audio

Survey Year by Program Existence



Summary

Strengths of the interactive video program have remained relatively constant over this two-year period. Interaction with others, access to previously unavailable classes, and learning (including technological exposure were most frequently cite in both years.

Responses to weaknesses of the program have, however, changed indicating significant improvement in equipment. This, however, has been replaced with increased citation of scheduling and behavior weaknesses. The scheduling weakness is also reflected as an increase in suggested improvements.

There were no significant differences in students evaluation of the interactive video program between those participating in 1995 and those participating in 1996. A significant interaction effect detected between survey year and year of program existence showed very little practical importance. It was, therefore, concluded there was no evidence of change in attitude toward or evaluation of the interactive video program by high school students from 1995 to 1996 on this portion of the questionnaire. There are differences, however, in student evaluations by site and by year of program existence.

Recommendations

This evaluation indicated there has been a significant improvement in equipment and its maintenance. There are, however, other problems that have occurred. Due to the increased frequency of response concerning problems with school schedules, this needs to be investigated to determine if this problem can be resolved. Students need to be on similar schedules if at all possible. In addition, there may be some problem developing in student behavior. Home site students have indicated a lack of discipline and/or cheating at the remote site. This may or may

not become a problem, but does merit further investigation.

In addition, the questionnaire needs to be revised. Three factors (Class Evaluation, Student Behavior, and Interaction) are not measuring consistently across years. This indicated that the questions within these factors are not clear, or the factor needs to be strengthened with additional questions. The cautions included concerning student behavior and class evalution my also reflect this problem.

Appendix A

Table 1: Responses to Strengths

Table 2: Responses to Weaknesses

Table 3: Responses to Suggested Improvements

Table 1

Codes for Answers given in response to the open-ended Strength

Factor	Sub-factor	Code	Label
Interaction	Meeting People	0	'Meet more people'
		2	'Interaction /Oth Schl'
		10	'Meeting different Schools'
Interaction	Open-minded	21	'More Open-minded'
		30	'More Opinions'
Learning	Technology	4	'Different - Rerun Lecture'
		6	'Picture'
		7	'Elmo'
		9	'Less intimidating'
		15	'Technology Exposure'
		17	'More Interesting'
		24	'Something New'
		25	'More I/A Conv'
Learning	Instruction	5	'Instruction'
		19	'Better Understanding'
		20	'More Hands On'
		22	'Prepare for College'
		23	'Better Classes'
		26	'Quality Teacher'
		33	'Easier'
		34	'Question as needed'
		36	'More Learning'
Access	Remote	1	'Remote'
Access	Available Classes	3	'More can take'
		8	'Class Variety'
		11	'Wider Access'
		18	'Take Prev. Unavail Class'

Table 1 (Continued)

Factor	Sub-factor	Code	Label
Behavior		12	'Greater Student Responsibility'
		13	'Less Cheating'
		14	'Increase Listening'
		29	'More Participation'
		35	'Better Study Habits'
Other		16	'None'
		27	'Saves Money'
		28	'More students/teacher'
		31	'Material Timely'
		32	'Better Environment'

Table 2

Weakness Response Codes By Factors and Factor Sub-divided

Factor	Sub-factor	Code	Label
Behavior		0	'Increased Absence'
		4	'Easy to Cheat'
		5	'Noisy (Talking)'
		10	'Lack Participation'
		21	'Lack Discipline'
		29	'Pay less Attention'
		36	'Boring'
Equipment	Sound	1	'Equipment - Sound'
		30	'High Voice not Heard'
Equipment	Camera	2	'Equipment - Camera'
		14	'Video Intimidating'
		38	'Video Small'
		39	'TV Glare'
Equipment		6	'Time - Iniating Equipment'
		19	'Lack Communication'
		24	'Equip Fail - Severe'
		42	'Slow - Delays'
Equipment	Minor	28	'Equip Fail - Occas'
Instruction		7	'Attention to Remote Students'
		8	'1-1 diff with remote'
		12	'Teacher Attn to HomeSite'
		13	'Instruction Light'
		15	'Teacher attn divided'
		25	'Little Learning'
		35	'Difficult Learning'
		40	'No Extra Help'

Table 2 (Continued)

Factor	Sub-factor	Code	Label
Instruction	Remote	9	'Teachers Need to be There'
		11	'Personal Contact Other Student'
		22	'No teacher at Remote'
		27	'Personal Contact Techer'
		31	'Impersonal - slight'
		34	'Remote less impt'
Scheduling		16	'Different School Holidays'
		23	'Schedule Conflicts'
		26	'Class Cancelled'
Other		3	'3 hour meeting too long'
		17	'Mail Late'
		18	'None'
		20	'Too many students/teacher'
		32	'Due date materials'
		33	'More space'
		37	'Large Classes'
		41	'No Field Trip'

Table 3

Suggested Improvement Response Codes By Factors and Factor Sub-divided

Factor	Sub-factor	Code	Label
Equipment	Sound	1	'Fix Sound'
Equipment	Camera	2	'Fix Camera'
Equipment		16	'User-Friendly Equipment'
		17	'Facilitator initiate equipment pri'
		19	'Class on Equipment Use'
		29	'Fix equipment'
		30	'Trained Eqip/fix standby'
		42	'Need Chalkboard'
		47	'Better Communication'
Learning	Class	3	'More class meetings - less lngth'
		14	'Require # Students/Site'
		21	'Reduce lecture time'
		23	'Longer Class Period'
		24	'Smaller Classes'
		41	'Rotate Home/remote'
Learning	Discipline	8	'Better Discipline'
		28	'Better discipline - remote'
		44	'Screen students'
Learning	Instruction	10	'No Learning'
		22	'Better Teacher Interaction'
		25	'Better Teachers'
		35	'Syllabus'
		37	'Experienced Teachers'
		38	'Remove facilitators'
		46	'Tutors'
Remote		15	'Facilitator at Remote'
		18	'Teacher needs to visit'

Table 3 (Continued)

Factor	Sub-factor	Code	Label
Interaction		9	'More Interaction'
		13	'Some Total Class Meetings'
		20	'Invite More Schools'
		33	'More people'
Scheduling		26	'Synchronize time frame'
		27	'Same schedule'
		43	'Snowday Schedule'
Variety		4	'Advertise'
		5	'More locations'
		12	'Offer More Classes'
Other		11	'Quit Using'
		31	'Internet use'
		32	'More exposure class content'
		34	'none'
		45	'Return work'
Environment		6	'Larger Monitor'
		7	'Better Setting'
		36	'More seating'
		39	'Overhead Speakers'
		40	'Bigger Desks'